

U.S.C.G. Merchant Marine Exam

Assistant Engineer-MODU

Q716 Engineering Safety-Environmental Protection

(Sample Examination)

Choose the best answer to the following Multiple Choice Questions

1. Which of the listed characteristics applies to a semi-portable CO₂ system?

- (A) Each cylinder must weigh less than 50 pounds.
- (B) It has a portable hose and nozzle.
- (C) The cylinders are mounted horizontally.
- (D) It has distribution piping installed permanently.

If choice B is selected set score to 1.

2. Which of the petroleum products listed has a flash point below 150°F?

- (A) Light fuel oils
- (B) Lubricating oils
- (C) Road oils
- (D) Asphalt

If choice A is selected set score to 1.

3. To activate an air regeneration canister on a survival craft, you _____.

- (A) put it into a container of water
- (B) tear off the tabs on the canister
- (C) turn it upside down
- (D) push "on" button

If choice B is selected set score to 1.

4. An oxygen indicator will detect _____.

- (A) the presence of harmful amounts of carbon monoxide
- (B) concentrations of explosive gas
- (C) an oxygen deficiency in a space
- (D) all of the above

If choice C is selected set score to 1.

5. (2.5.8.3-1) A large fire has developed in the room accessed by door "E". To combat the fire you should _____. Illustration SF-0013

- (A) only need to set up a hose team to cool the door, then open the door and extinguish the fire using a type B-II extinguisher
- (B) advance the hose team into the room without any additional preparatory action
- (C) cool adjoining horizontal and vertical surfaces before opening the door to extinguish the fire
- (D) keep the door tightly closed until all the oil has been consumed by the fire

If choice C is selected set score to 1.

6. When required to work in an area where explosive gases may accumulate, you should use hand tools which are _____.

- (A) high carbon steel
- (B) approved by the Coast Guard
- (C) fixed with a ferrous cover
- (D) non-ferrous

If choice D is selected set score to 1.

7. A fire that has developed in a pile of rubber gasket material would be classified as a _____.

- (A) class "A"
- (B) class "B"
- (C) class "C"
- (D) class "D"

If choice A is selected set score to 1.

8. Which type of respiratory protection is preferable for the repair/investigation personnel in a hydrogen sulfide (H_2S) environment?

- (A) Emergency Escape Breathing Apparatus (EEBA)
- (B) U.S. Navy Oxygen Breathing Apparatus (OBA)
- (C) Positive Self-Contained Breathing Apparatus (SCBA)
- (D) Self-Contained Demand-Type Breathing Apparatus (SCDBA)

If choice C is selected set score to 1.

9. The explosive range of methane is 5% to 15% by volume in air. This means a vapor/air mixture of _____.

- (A) 3 percent methane by volume is too rich to burn
- (B) 5 percent methane by volume will give a reading of 100 percent LEL on a combustible gas indicator
- (C) 10 percent methane by volume is too rich to burn
- (D) 20 percent methane by volume is too lean to burn

If choice B is selected set score to 1.

10. In accordance with 33 CFR Subchapter O (Pollution), which of the following is a mandatory section of the shipboard oil pollution emergency plan?

- (A) list of individuals required to respond
- (B) plan exercises
- (C) reporting requirements
- (D) removal equipment list

If choice C is selected set score to 1.

11. All of the following are part of the fire triangle EXCEPT _____.

- (A) fuel
- (B) oxygen
- (C) heat
- (D) electricity

If choice D is selected set score to 1.

12. Which of the conditions listed is necessary for a substance to burn?

- (A) The mixture of vapors with air must be between the LEL and the UEL.
- (B) The air must contain oxygen in sufficient quantity.
- (C) The temperature of the substance must be equal to or above its fire point.
- (D) All of the above.

If choice D is selected set score to 1.

13. A fire can be extinguished by removing _____.

- (A) the fuel
- (B) the heat
- (C) the oxygen
- (D) any of the above

If choice D is selected set score to 1.

14. The external flotation bladder on an immersion suit should be inflated _____.

- (A) before you enter the water
- (B) after you enter the water
- (C) after one hour in the water
- (D) after you notice that your suit is losing buoyancy

If choice B is selected set score to 1.

15. During fueling operations, a deck fire has occurred due to a leaking fuel line. You should FIRST _____.

- (A) stop the transfer of fuel
- (B) prevent the spread of fire with a foam dam
- (C) apply CO₂ on the burning fuel at its source
- (D) blanket the fuel spill with foam

If choice A is selected set score to 1.

16. A hand portable CO₂ fire extinguisher is effective on burning oil only _____.

- (A) if applied in connection with foam
- (B) to prevent rekindling
- (C) if applied promptly
- (D) if attempts to extinguish the fire with low velocity fog have failed

If choice C is selected set score to 1.

17. The most effective method of extinguishing a class "A" fire is by _____.

- (A) quenching and cooling
- (B) using non-conducting extinguishers
- (C) blanketing and smothering
- (D) using a sodium based dry chemical

If choice A is selected set score to 1.

18. The wooden plug fitted tightly in the vent of a damaged tank may prevent the tank from _____.

- (A) collapsing
- (B) developing free surface moments
- (C) developing free surfaces
- (D) filling completely

If choice D is selected set score to 1.

19. A three inch overboard discharge line, located six feet below the waterline, has ruptured and separated from the hull. What would be the minimum number of strokes per minute required from a 10" x 8" x 12" duplex double acting reciprocating bilge pump, operating at 96% efficiency, to keep the bilge water level from continuing to rise? Illustration SF-0034

- (A) 45 strokes per minute
- (B) 56 strokes per minute
- (C) 87 strokes per minute
- (D) 98 strokes per minute

If choice C is selected set score to 1.

20. The airborne concentrations of substances (such as hydrogen sulfide) under which nearly all workers may be repeatedly exposed without adverse effects are called _____.

- (A) exposure limits
- (B) concentration limits
- (C) threshold limit values
- (D) substance limit values

If choice C is selected set score to 1.

21. A flat block placed under the end of a shore for the purpose of distributing pressure is referred to as a _____.

- (A) strong back
- (B) shole
- (C) shore foot
- (D) butt piece

If choice B is selected set score to 1.

22. A class "D" fire would involve the burning of _____.

- (A) diesel oil
- (B) dunnage
- (C) electrical insulation
- (D) magnesium

If choice D is selected set score to 1.

23. When checking the level of a volatile liquid in a tank on the weather deck of a tank vessel, you should position yourself _____.

- (A) on the windward side of the opening
- (B) on the leeward side of the opening
- (C) at a right angle to the wind direction
- (D) so that the obstruction of your body will protect you from the fumes

If choice C is selected set score to 1.

24. When combating a major electrical fire, the main consideration is _____.

- (A) preventing salt water damage to electrical equipment
- (B) reducing the possibility of electrical shock to personnel
- (C) preventing a total loss of electrical power
- (D) eliminating the toxic fumes from burning insulation

If choice B is selected set score to 1.

25. Which of the following is required to be included in the fireman's (emergency) outfit?

- (A) Chemical protection face shield
- (B) Approved work vest
- (C) Self-contained breathing apparatus
- (D) 5 cell approved flashlight

If choice C is selected set score to 1.

26. If additional weight is placed on the main deck of the vessel shown in the illustration _____.
Illustration SF-0023

- (A) KB will go down
- (B) GM will increase
- (C) G will rise
- (D) K will rise

If choice C is selected set score to 1.

27. When fighting a liquefied natural gas fire, you should _____.

- (A) secure the source of gas, then extinguish the fire
- (B) extinguish the fire, then secure the source of gas
- (C) use only carbon dioxide
- (D) use only dry chemical

If choice A is selected set score to 1.

28. Which of the following is classified as a grade "E" combustible liquid?

- (A) Very light naphtha
- (B) Bunker "C"
- (C) Most commercial gasoline
- (D) Benzene

If choice B is selected set score to 1.

29. A rigid lifesaving device designed for a group of survivors to hold on to while in the water is defined as a _____.

- (A) life raft
- (B) life cushion
- (C) life preserver
- (D) buoyant apparatus

If choice D is selected set score to 1.

30. If flammable vapors have penetrated a gas free space, which of the following actions would be the most hazardous to perform?

- (A) Opening switches in the space to de-energize circuits.
- (B) Closing switches adjacent to the space to operate vent fans.
- (C) Leaving electrical circuits energized in the space.
- (D) Securing all power to the space from a remote location.

If choice A is selected set score to 1.

31. In accordance with 33 CFR Subchapter O (Pollution), each operation involving the transfer of oil or oily mixture that requires an entry in the Oil Record Book shall be fully recorded _____.

- (A) without delay
- (B) within 12 hours of completion of the operation
- (C) within 24 hours of completion of the project
- (D) within 48 hours of completion of the operation

If choice A is selected set score to 1.

32. Clogged limber holes can endanger a ship's stability by _____.

- (A) increasing water area on the keelson
- (B) preventing water from draining to the bilge well
- (C) decreasing off-center weight
- (D) preventing the free surface effect

If choice B is selected set score to 1.

33. Low velocity water fog is used in firefighting as a _____.

- (A) barrier against radiant heat
- (B) smothering agent
- (C) cooling agent
- (D) all of the above

If choice D is selected set score to 1.

34. Which of the following statements is true concerning carbon dioxide when used as a fire extinguishing agent?

- (A) Carbon dioxide should be applied slowly to a large engine room fire.
- (B) Its total cooling effect is far greater than water.
- (C) Its smothering effect is excellent for class "B" fires.
- (D) Carbon dioxide is corrosive when exposed to fire.

If choice C is selected set score to 1.

35. When launching an inflatable life raft, you should make sure that the operating cord is _____.

- (A) fastened to some substantial part of the vessel
- (B) secured to the hydrostatic release
- (C) fastened to the raft container
- (D) not fastened to anything

If choice A is selected set score to 1.

36. Small oil spills on deck can be prevented from contaminating any waters by _____.

- (A) plugging all scuppers and drains
- (B) regularly emptying all drip pans
- (C) thoroughly draining all bunkering hoses
- (D) placing floating booms around the ship

If choice A is selected set score to 1.

37. Which of the following statements represents the correct action to take when three crew members discover a fire?

- (A) One man report the fire, one man fight the fire, and one man act as a safety observer.
- (B) One man report the fire, and the other two men fight the fire.
- (C) One man report the fire, one man fight the fire and one man evacuate and secure the area.
- (D) All three men fight the fire and report it immediately after it is extinguished.

If choice C is selected set score to 1.

38. Symbol number "3" shown in the illustration represents which of the following? Illustration SF-0022

- (A) amidships
- (B) baseline
- (C) forward perpendicular
- (D) displacement

If choice A is selected set score to 1.

39. Combustible gas indicators incorporate the use of a/an _____.

- (A) Wheatstone bridge
- (B) inflatable bag
- (C) vapor-detecting carbon compound
- (D) sensitive liquid chemical

If choice A is selected set score to 1.

40. A liquid, as listed on a Material Safety Data Sheet (MSDS), having a flash point below 100°F (37.78°C) is called a/an _____.

- (A) explosive liquid
- (B) combustible liquid
- (C) flammable liquid
- (D) viscous liquid

If choice C is selected set score to 1.

41. Paints and solvents used aboard a vessel should be _____.

- (A) drained into a common container after each use
- (B) returned to the paint locker after each use
- (C) stowed safely at the work site until work is completed
- (D) covered with a fine mesh screen to protect from ignition sources

If choice B is selected set score to 1.

42. A simple precaution to reduce the possibility of accidental fires in the paint locker is to _____.

- (A) label the fixed firefighting system
- (B) store paint cans on metal shelves only
- (C) not allow oily rags to accumulate in the space
- (D) place a portable fire extinguisher immediately outside the locker

If choice C is selected set score to 1.

43. According to 33 CFR Subchapter O (Pollution), an oceangoing ship of over 400 gross tons must be fitted with a standard discharge shore connection. What size bolt circle diameter is required for this shore connection to transfer oily ballast to a shore side reception facility?

- (A) 125 mm
- (B) 183 mm
- (C) 215 mm
- (D) 250 mm

If choice B is selected set score to 1.

44. To prevent the spread of fire by convection you should _____.

- (A) cool the bulkhead around the fire
- (B) shut off electrical power
- (C) close all openings to the area
- (D) remove combustibles from direct exposure

If choice C is selected set score to 1.

45. Fire detecting systems on vessels may be arranged to sense _____.

- (A) ionized particles
- (B) smoke
- (C) rate of temperature rise
- (D) all of the above

If choice D is selected set score to 1.

46. Life jackets should be stowed in _____.

- (A) the forepeaks
- (B) the pump room
- (C) readily accessible spaces
- (D) locked watertight containers

If choice C is selected set score to 1.

47. When using foam, a "Class B" fire is extinguished by _____.

- (A) replacing the fuel
- (B) cooling the surface
- (C) smothering the fire
- (D) all of the above

If choice C is selected set score to 1.

48. Which of the following statements is true concerning Halon 1301 fire extinguishing equipment?

- (A) Halon extinguishes the fire by smothering action.
- (B) The agent cannot be used on electrical fires because it leaves a residue.
- (C) The agent is highly toxic at normal room temperature.
- (D) For portable extinguishers, the agent is only available in a 2 pound unit.

If choice D is selected set score to 1.

49. The source of power for the CO₂ discharge alarm siren is obtained from _____.

- (A) the general alarm 24 volt DC bus
- (B) the flow of CO₂ under pressure
- (C) the emergency power and lighting bus
- (D) all of the above

If choice B is selected set score to 1.

50. The process that occurs when heat is generated by a chemical reaction within a substance and continues to a point of ignition is known as _____.

- (A) chemical ignition
- (B) chemical combustion
- (C) radiation ignition
- (D) spontaneous combustion

If choice D is selected set score to 1.

SF-0013

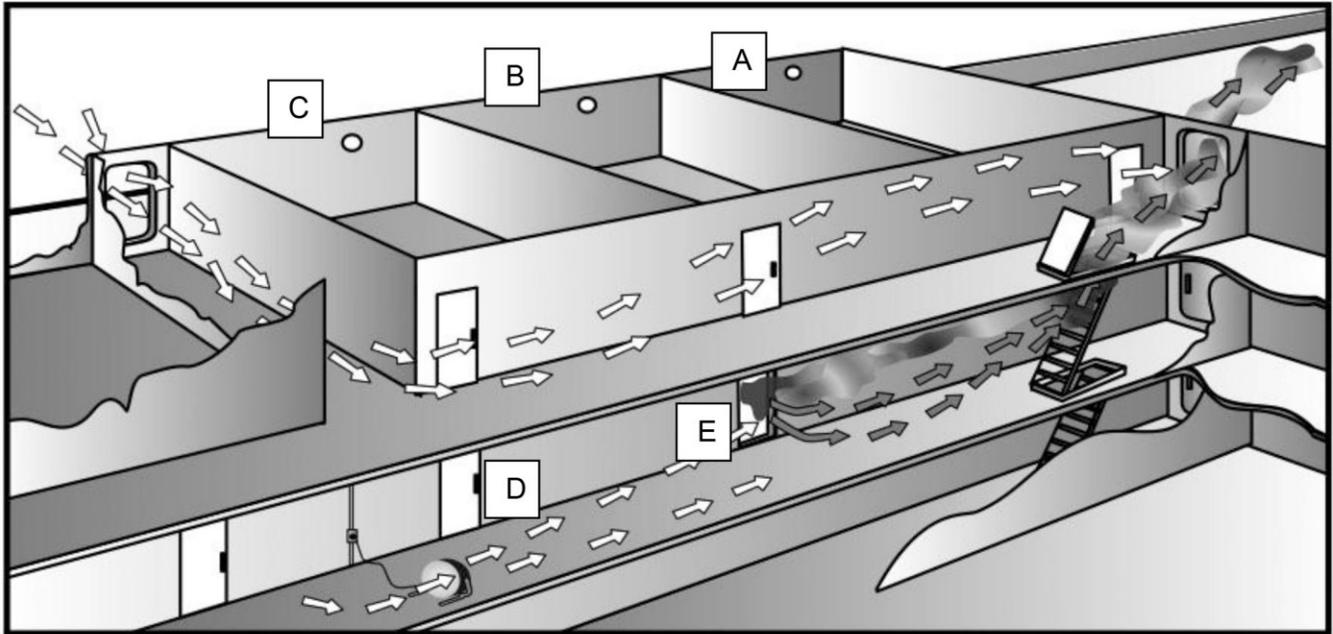


Figure 1

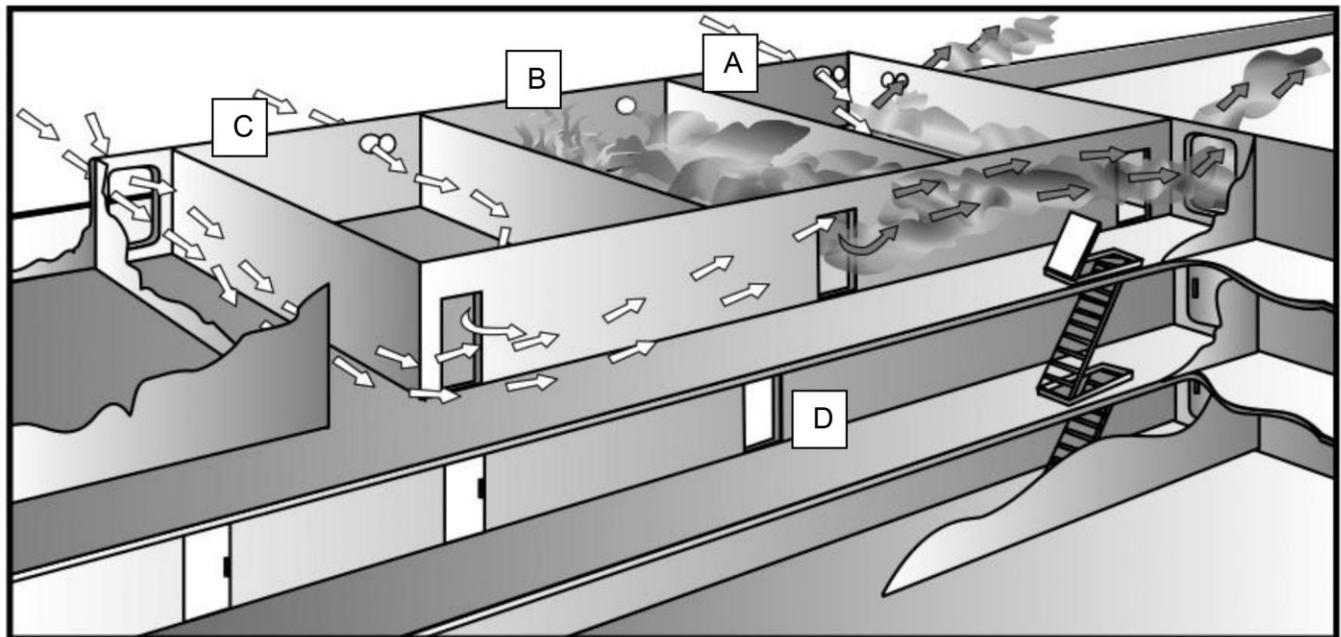


Figure 2

Adapted for testing purposes only from Marine Fire Prevention, Firefighting and Fire Safety
U.S. Department of Transportation Maritime Administration

Further reproduction prohibited without permission

SF-0022



1



2



3

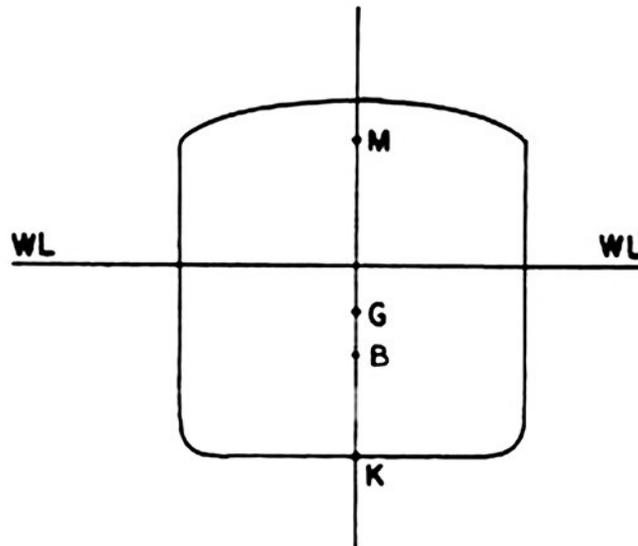


4



5

SF-0023



Adapted for testing purposes only from HAYLER, American Merchant Seaman's Manual

Copyright © 2010 by Cornell Maritime Press

Further reproduction prohibited without permission

SF-0034

Flow of Water Through Holes (Gallons per Minute)

HOLE DIA. IN INCHES	HEAD OF WATER IN FEET												
	2	4	6	8	10	12	14	16	18	20	24	28	32
1	28	40	49	56	63	69	74	79	84	89	97	105	112
2	111	157	192	222	248	272	294	314	333	351	384	415	444
3	250	354	433	500	559	612	661	707	750	790	866	935	1000
4	445	629	770	889	994	1089	1176	1257	1333	1405	1540	1663	1778
5	695	982	1203	1389	1553	1701	1837	1964	2083	2196	2406	2598	2778
6	1000	1414	1732	2000	2236	2449	2646	2828	3000	3162	3464	3741	4000
7	1361	1925	2357	2722	3043	3333	3601	3849	4083	4303	4714	5092	5444
8	1777	2514	3078	3555	3974	4354	4702	5027	5332	5620	6157	6650	7109
9	2249	3181	3896	4499	5030	5510	5951	6362	6748	7113	7792	8416	8997
10	2777	3927	4809	5553	6209	6802	7347	7854	8330	8781	9619	10390	11107
11	3360	4752	5820	6720	7514	8231	8890	9504	10080	10626	11640	12573	13441
12	4000	5655	6926	7997	8941	9795	10579	11310	11996	12645	13852	14961	15995
13	4693	6637	8129	9386	10494	11496	12417	13274	14079	14841	16257	17560	18772
14	5443	7697	9426	10885	12170	13331	14400	15394	16327	17210	18853	20364	21770
15	6246	8834	10820	12494	13969	15302	16528	17667	18740	19754	21640	23374	24988
16	7106	10051	12310	14214	15892	17409	18804	20102	21322	22475	24620	26593	28429
17	8024	11347	13897	16047	17942	19654	21229	22694	24071	25373	27795	30022	32095
18	8996	12722	15582	17992	20116	22035	23802	25445	26988	28448	31164	33660	35985
19	10024	14177	17363	20049	22416	24555	26523	28354	30073	31700	34726	37408	40098
20	11110	15710	19241	22218	24840	27211	29392	31421	33326	35129	38483	41566	44436
21	12244	17316	21208	24488	27379	29992	32396	34632	36732	38719	42416	45814	48977
22	13439	19008	23280	26881	30054	32923	35561	38016	40322	42503	46560	50290	53763
23	14688	20772	25441	29376	32844	35978	38861	41544	44064	46447	50881	54958	58753
24	15995	22622	27707	31993	35769	39183	42323	45245	47989	50585	55414	59853	63986
25	17356	24545	30061	34711	38809	42513	45920	49090	52067	54883	60122	64939	69424
26	18770	26546	32513	37542	41974	45980	49664	53093	56313	59359	65025	70235	75085
27	20242	28627	35061	40485	45264	49584	53557	57254	60727	64012	70122	75740	80971
28	21770	30787	37707	43539	48679	53325	57598	61574	65309	68842	75413	81455	87080
29	23353	33026	40449	46706	52220	57203	61787	66053	70059	73849	80898	87380	93414
30	24992	35345	43289	49985	55885	61219	66125	70690	74977	79033	86577	93514	99971
31	26683	37735	46216	53365	59665	65359	70597	75470	80048	84378	92432	99838	106732
32	28434	40212	49250	56868	63581	69649	75231	80424	85302	89916	98499	106391	113738

Adapted for testing purposes only

Further reproduction prohibited without permission